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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,033	08/04/2003	Chien-Meen Hwang	95-538	4695

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MANELLI DENISON & SELTER
2000 M STREET NW SUITE 700
WASHINGTON, DC 20036-3307

EXAMINER

WANG, TED M

ART UNIT PAPER NUMBER

2611

DATE MAILED: 11/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/633,033

Applicant(s)

HWANG ET AL.

Examiner

Ted M. Wang

Art Unit

2611

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/28/2003</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

- Page 1, line 19, change "the" to --- that ---.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art of the instant application in view of Cripps et al. (US 2002/0118783).

- With regard claim 1, the admitted prior art of the instant application teaches a method in an OFDM direct conversion receiver (Fig.1 and page 1 line 21) configured for receiving a wireless signal (Fig.1 element 12 input signal), the method comprising:

recovering first and second components from the wireless signal (Fig.1 element 12 input signal) by mixing (Fig.1 elements 18a and 18b and page 1 line 23) the wireless signal with first (Fig.1 element 16 output to the input of

mixer 18a) and second (Fig.1 element 22 output to the input of mixer 18b) carrier frequency signals, respectively (page 1 lines 21-25), the second carrier frequency signal phase-shifted by a prescribed amount relative to the first carrier frequency signal (Fig.1 elements 16, 18a, 18b and 22 and page 1 lines 21-25);

filtering each of the first and second components (Fig.1 elements 20a and 20b) to obtain filtered first and second components (Fig.1 elements 20a and 20b outputs (I and Q), respectively;

estimating amplitude and phase imbalances between the filtered first and second components according to a time domain based estimation algorithm (page 2 lines 10-16); and

compensating for the amplitude and phase imbalances in the recovered first and second components (page 2 lines 10-16).

The admitted prior art of the instant application subject matter as described in the above paragraph except for specifically teaching filtering a pilot carrier from each of the first and second components to obtain filtered first and second components, respectively.

However, Cripps et al. teaches filtering a pilot carrier (Fig.6 step 670) from each of the first and second components to obtain filtered first and second components, respectively (paragraphs 44, 48 and 57) in order to reduce the noise energy so that the recovered signal quality can be improved.

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the filters as taught by Cripps et al. into the compensation circuit of the admitted prior art of the instant application so as to improve the recovered signal quality.

- With regard claim 2, the modified circuit of the admitted prior art of the instant application and Cripps et al. further discloses wherein the filtering further includes suppressing any pilot energy from the first and second components (Fig.6 step 670 and Paragraphs 48 and 57 of Cripps). Where the pilot filtering process, the pilot signals are filtered out in step 670 of Cripps so that only the data signals remain, is the function of a pilot notch filter. The explanation of all the limitation is already addressed in the above paragraph (claim 1).
- With regard claim 5, the admitted prior art of the instant application teaches an OFDM direct conversion receiver (Fig.1 and page 1 line 21) configured for receiving a wireless signal (Fig.1 element 12 input signal), the method comprising:

an analog front end (Fig.1 elements 12-20b) configured for recovering first and second components from the wireless signal (Fig.1 element 12 input signal) by mixing (Fig.1 elements 18a and 18b and page 1 line 23) the wireless signal with first (Fig.1 element 16 output to the input of mixer 18a) and second (Fig.1 element 22 output to the input of mixer 18b) carrier frequency signals, respectively (page 1 lines 21-25), the second carrier

frequency signal phase-shifted by a prescribed amount relative to the first carrier frequency signal (Fig.1 elements 16, 18a, 18b and 22 and page 1 lines 21-25);

a filter module (Fig.1 elements 20a and 20b) configured for filtering each of the first and second components (Fig.1 elements 20a and 20b) to obtain filtered first and second components (Fig.1 elements 20a and 20b outputs (I and Q), respectively;

an estimator module configured estimating amplitude and phase imbalances between the filtered first and second components according to a time domain based estimation algorithm (page 2 lines 11-12); and

a compensator configured for compensating for the amplitude and phase imbalances in the recovered first and second components (page 2 lines 10-11 and 14-16).

The admitted prior art of the instant application subject matter as described in the above paragraph except for specifically teaching a filter module configured for filtering a pilot carrier from each of the first and second components to obtain filtered first and second components, respectively.

However, Cripps et al. teaches a filter module configured for filtering a pilot carrier from each of the first and second components after A/D converter to obtain filtered first and second components, respectively (Fig.6 step 670 and paragraphs 44, 48 and 57) in order to reduce the noise energy so that the recovered signal quality can be improved.

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the filter module as taught by Cripps et al. into the compensation circuit of the admitted prior art of the instant application so as to improve the recovered signal quality.

- With regard claim 6, the modified circuit of the admitted prior art of the instant application and Cripps et al. further discloses wherein the filter module further includes suppressing any pilot energy from the first and second components (Paragraphs 48 and 57 of Cripps). Where the **pilot filtering process**, the pilot signals are filtered out in step 670 of Cripps so that only the data signals remain, is the function of a pilot notch filter. The explanation of all the limitation is already addressed in the above paragraph (claim 5).

4. Claims 3, 4, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art of the instant application and Cripps et al. (US 2002/0118783) as applied to claims 2 and 6 above, and further in view of Husted et al. (US 6,721,547).

- With regard claim 3, the admitted prior art of the instant application and Cripps et al. disclose all subject matter as described in the above paragraph except for specifically teaching wherein the filtering further includes filtering any DC energy from the first and second components.

However, Husted et al. teaches an In-band and out-of-band signal detection for an OFDM system (column 2 lines 24-27) that the filtering further includes filtering any DC energy from the first and second components (Fig. 3

elements 250-Q /245-Q and 250-IP/245-IP and column 10 lines 31-43, where 250-Q/245-Q and 250-IP/245-IP are DC notch filters.) in order to eliminate the DC offset caused by the ADC 190 (column 10 lines 31-43)) so that the recovered signal quality can be improved.

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the Leaky bucket filters as taught by Husted et al. into the admitted prior art of the instant application and Cripps' filtering module so as to improve the recovered signal quality.

- With regard claim 4, the limitation of "wherein the filtering includes suppressing the pilot energy and the DC energy using a pilot notch filter and a DC notch filter, respectively" has been addressed in the above paragraphs (claims 2 and 3). All limitation is contained in claims 2 and 3. The explanation of all the limitation is already addressed in the above paragraph.
- With regard claim 7, the admitted prior art of the instant application and Cripps et al. disclose a DC rejection circuit in front end of the demodulation circuit (page 6 lines 26-27) and all other subject matter as described in the above paragraph except for specifically teaching wherein the filter module includes a second filter configured for filtering any DC energy from the first and second components.

However, Husted et al. teaches an In-band and out-of-band signal detection for an OFDM system (column 2 lines 24-27) that the filter module includes a second filter configured for filtering any DC energy from the first and

second components (Fig. 3 elements 250-Q /245-Q and 250-IP/245-IP and column 10 lines 31-43, where 250-Q/245-Q and 250-IP/245-IP are DC notch filters.) in order to eliminate the DC offset caused by the ADC 190 (column 10 lines 31-43)) so that the recovered signal quality can be improved.

Therefore, It would have been obvious to one of ordinary skill in the art at the time of the invention was made to include the Leaky bucket filters as taught by Husted et al. into the admitted prior art of the instant application and Cripps' filter module so as to improve the recovered signal quality.

- With regard claim 8, the limitation of "wherein the first filter is a pilot notch filter and the second filter is a DC notch filter, respectively" has been addressed in the above paragraphs (claims 6 and 7). All limitation is contained in claims 6 and 7. The explanation of all the limitation is already addressed in the above paragraph.

Conclusion

5. Reference Liao et al. (Adaptive compensation for imbalance and offset losses in direct conversion transceivers, Vehicular Technology, IEEE Transactions on Volume 42, Issue 4, Nov. 1993 Page(s):581 - 588, Digital Object Identifier 10.1109/25.260752) is cited because they are put pertinent to the Adaptive compensation for imbalance and offset losses in direct conversion transceivers. However, none of references teach detailed connection as recited in claim.

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6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ted M. Wang



Ted M Wang
Examiner
Art Unit 2611